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LOWER COSTS OF PRODUCTION OF CHICKPEA

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Lowering Cost of Chickpea Production

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Summary
The objective of this study was to examine different ways for producers to lower the cost of chickpea production with the main focus on disease management. We examined four different avenues to lowering production costs. Various combinations of seeding rates, fertilizer rates, row spacing, and timing of fungicide application was targeted for lower production costs in Sanford and Yuma chickpeas. Disease pressure was different in each year of the study. In 2003, we observed some early disease in the trial, however, disease pressure was minimal throughout the year as moisture conditions deteriorated. In 2004, early disease was not evident, however, disease pressure advanced rapidly by mid-August. In 2005, disease pressure was observed very early and was moderate throughout the growing season. Overall, the largest treatment effect we observed dealt with crop variety. There was significantly lower disease pressure and significantly higher yield in the Yuma chickpeas compared to Sanford in all three years of the trial. The timing of fungicide application responded differently depending on the year. Treatment one involved the first fungicide applied before the onset of disease. This treatment resulted in higher yields in years where early disease was evident and progressed throughout the growing season (in 2005), but showed no significant differences when early disease was not evident (in 2004) or slight (in 2003). In general, the nine inch row spacing showed higher yields compared to 18 inch. We observed minimal differences with the other treatments, however, none were consistent throughout the duration of the test.

Background and objectives of study
Producers in Southwest Saskatchewan have been growing chickpeas for a number of years with great financial success. In many cases this has gave farmers the economic boost needed to make their operation viable. With the advancement of ascochyta, and lower chickpea prices, producers are losing this economic edge. In order to regain this advantage, producers must be able to adequately manage their ascochyta and at the same time reduce the cost of production associated with this crop. We examined four different avenues to lowering the cost of chickpea production with the main focus on disease management. Various combinations of seeding rates, fertilizer rates, row spacing, and timing of fungicide application was targeted for lower production costs. The various treatments that were studied in this trial to lower production costs can be easily adapted by producers.

Study description
The study was conducted at Swift Current from 2003-05. A Split plot design with four replicates was used. Sanford chickpea, an ascochyta susceptible variety, and Yuma chickpea, a somewhat resistant variety, was studied. Three different seeding variables were studied: seeding rate (130 and 100 lbs/ac), fertilizer rate (11-51-0 at 50, 25, and 0 lbs/ac), row spacing (9 and 18 inch). These variables were used in combination to make twelve treatments. These 12 treatments were split and sprayed with fungicides using three different timing techniques:
1. Calendar spray (first application early before onset of disease then every 14 days up to 4 apps).
2. Calendar spray (skip first application then every 14 days up to 3 apps).
3. As needed spray.

Actual spray dates varied depending on when the onset of the disease occurred in each year. The crop was seeded into durum stubble using a Flexi-Coil 5000 air drill with double shoot stealth openers.

Results and conclusions

The largest treatment effect we observed dealt with crop variety. There was significantly lower disease pressure and significantly higher yield in the Yuma chickpeas compared to Sanford (Table1).

Table 1. Average yield and disease rating of Sanford and Yuma Chickpeas 2003-05

Crop	Yield (Bus/ac)	Disease Rating (1-8) Horsfall-Barratt Scale
Yuma Chickpea	16.1a	2.4a
Sanford Chickpea	10.7b	5.0b

The nine inch row spacing showed significantly higher yields compared to 18 inch spacing in the Yuma variety but not with the Sanford variety (Table 2). The wider row spacing did not increase the effectiveness of fungicides, as was hypothesized. In fact, wider row spacing was detrimental to yield in Yumas, likely due to the increased inter-row competition. Sanford yields were slightly reduced by the wide row spacing but not enough to make a significant difference. In this case, there was likely little inter-row competition due to poor stands. If granular inoculant is used to inoculate the soil, only half the amount of granular inoculate is used on 18 inch row spacing compared to 9 inch row spacing, thus cutting the inoculant bill in half. This advantage, however, is not enough to offset the yield losses associated with wider row spacing in most years.

Table 2. Average Response to Row spacing on Chickpea Yields (Bus/Ac) 2003-05

Spacing	Yuma Chickpea	Sanford Chickpea
9 inch	17.8a	11.2a
18 inch	14.4b	10.2a

The fungicide treatments had an effect in one of the three years. Treatment one involved the first fungicide applied before the onset of disease. This treatment resulted in higher yields in 2005, where early disease was evident and progressed throughout the growing season, but showed no significant differences in 2003 and 2004 when early disease was not evident or slight (Tables 3, 4, and 5).

Table 3: Response of Fungicide timing on Chickpea Yield 2003

Fungicide	Sanford yield (Bus/Ac)	Yuma yield (Bus/Ac)
1.Early Calendar	9.7 a	11.2 a
2. Late Calendar	9.9 a	11.3 a
3. As needed	9.7 a	11.6 a

Table 4: Response of Fungicide timing on Chickpea Yield 2004

Fungicide	Sanford yield (Bus/ac)	Yuma yield (Bus/ac)
1.Early Calendar	9.1a	15.2a
2. Late Calendar	9.2a	16.9a
3. As needed	9.3a	16.0a

Table 5: Response of Fungicide timing on Chickpea Yield 2005

Fungicide	Sanford yield (Bus/Ac)	Yuma yield (Bus/Ac)
1.Early Calendar	17.5 a	22.7 a
2. Late Calendar	11.3 b	20.6 b
3. As needed	11.1 b	19.2 b

Fertilizer rate showed no significant yield responses although general trends were observed (Table 6).

Table 6: Average Response of Fertilizer rate on Chickpea Yield 2003-05

Fertilizer Rate (11-51-0) (lbs/ac)	Sanford Yield (Bus/ac)	Yuma Yield (Bus/ac)
50	11.1 a	16.8 a
25	10.9 a	15.7 a
0	10.2 a	15.6 a

Seeding rates showed no significant yield responses within each respective variety (Table 7).

Table 7. Average Response of Seeding Rates on Chickpea Yields (Bus/Ac) 2003-05

Seeding Rates (lbs/ac)	Yuma Chickpea	Sanford Chickpea
130	16.5 a	10.7 a
100	15.7 a	10.9 a

Indication for further development

Since fungicides are the greatest input cost, resistant chickpea varieties will likely have the greatest impact on chickpea economics. In a year with early disease pressure, positive impacts have come from timely fungicide applications. As well, there are potential advantages to supplying a chickpea crop with nitrogen to insure a healthy plant when disease hits, since it takes time and energy for a pulse crop to fix its own nitrogen and disease infestations are often occurring earlier in the growing season.

Additional data must be obtained to determine recommendations on fertilizer rates, row spacing, and seeding rates. Continued work must be done with more resistant chickpea varieties, looking at time of spraying, and sequencing of various registered fungicides.

Information on benefits to producers

Chickpeas are in danger of becoming a "flash in the pan" crop for Saskatchewan. Due to bad experiences caused by high disease pressure, the use of susceptible varieties, and in a few instances, poor management, chickpea acres have declined since 2002. By addressing these issues, the producer will be able to successfully grow chickpeas for less dollars than previous years and improve this industry as a whole. By lowering the cost of production of chickpeas, and properly controlling ascochyta, producers will be able to use chickpeas as another tool when diversifying their farming operation.

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ICAR Database

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